

# *Curriculum vitae et studiorum*

## **Carolina Giorgetti**

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### **Personal information**

*Name:* Carolina

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### **Research experience**

**01/06/2018 – present**

Post-doctoral researcher in the Laboratory of Experimental Rock Mechanics (LEMR) at EPFL (École polytechnique fédérale de Lausanne), Switzerland

- Calibration and implementation of a prototype rock deformation apparatus designed to investigate the entire seismic cycle under realistic boundary conditions (confining pressure and pore fluid pressure), from low to high slip rates
- Investigation of the role of loading path and stress field orientation on fault reactivation through triaxial saw-cut experiments
- Investigation of the effect of fluid chemistry (pH and ions dissolved in water) on fault frictional properties in calcite-bearing faults

**01/10/2017 – 01/06/2018**

Scientific assistant in the Laboratory of Experimental Rock Mechanics (LEMR) at EPFL (École polytechnique fédérale de Lausanne), Switzerland

**01/08/2012 – 30/09/2012**

Professional Service for the Int Geo Mod S.r.l., spin-off company of the Università degli Studi di Perugia (Italy). The research activity consisted in the reconstruction of geological cross-sections through the Monte Amiata and Monte Cetona (Northern Apennines, Italy) integrating seismic reflection and geological data

### **Education**

**01/11/2014 – 21/02/2018**

PhD in Structural Geology and Rock Mechanics, Department of Earth Sciences, Sapienza University of Rome, Italy, defended on February 21<sup>st</sup> 2018 awarded with honors

*Thesis:* The mechanics of phyllosilicates-bearing faults: insights from field examples and rock deformation experiments

*Supervisor:* Prof. Cristiano Collettini

**08/10/2012 – 17/07/2014**

Master of Science in Exploration Geology, Sapienza University of Rome, Italy, obtained on July 17<sup>th</sup> 2014 with points 110/110 with honors

*Thesis:* The role of talc in the frictional properties of carbonate faults [*original title:* Ruolo del talco nelle proprietà dell'attrito di faglie sperimentali in carbonati]

*Supervisor:* Prof. Cristiano Collettini

*Co-supervisor:* Dott. B.M. Carpenter

**05/10/2009 – 12/07/2012**

Bachelor of Science in Geology, Department of Physics and Geology, University of Perugia, Italy, obtained on July 12<sup>th</sup> 2012 with points 110/110 with honors

*Thesis:* Geological cross-sections through the Monte Cetona ridge and the Valdichiana basin (Northern Apennines, Italy) integrating seismic reflection and geological data [*original title:* Sezioni geologiche attraverso la dorsale del Monte Cetona ed il bacino della Valdichiana da dati geologici di superficie e profili sismici a riflessione]

*Supervisor:* Prof. Massimiliano R. Barchi

## Funding

2019-2021: OFEN (Swiss Federal Office of Energy): Co-PI RAISE - The Role of fluid Acid concentration in Induced SEismicity) (135,000 CHF)

## Awards

**BritRock Prize 2018** awarded for the talk “Fault reactivation: insights from triaxial saw-cut experiments” at the annual meeting of the Tectonic Studies Group

## Publications

11. **Giorgetti, C.**, and Violay, M. (2021), The influence of loading path on fault reactivation: A laboratory perspective, *Geophysical Research Letters*, 48, e2020GL091466, doi:10.1029/2020GL091466
10. Violay, M., **Giorgetti C.**, Cornelio C., Aeschiman F., Di Stefano G., Gastaldo L., Wiemer S. (2021), HighSTEPS: A High Strain TEMperature Pressure and Speed Apparatus to study Earthquake mechanics, *Rock Mechanics and Rock Engineering*, 54, 2039–2052, doi:10.1007/s00603-021-02362-w
9. Mele Veedu, D., **Giorgetti, C.**, Scuderi, M. M., Barbot, S., Marone, C., and Collettini, C. (2020), Bifurcations at the Stability Transition of Earthquake Faulting, *Geophysical Research Letters*, *Geophysical Research Letters*, 47, e2020GL087985, doi:10.1029/2020GL087985
8. Trippetta, F., Ruggieri R., Brandano M., **Giorgetti, C.** (2020), Petrophysical properties of heavy oil-bearing carbonate rocks and their implications on petroleum system evolution: Insights from the Majella Massif, *Marine and Petroleum Geology*, 111, 350–362, doi:10.1016/j.marpetgeo.2019.08.035
7. Noël, C., Passelègue, F. X., **Giorgetti, C.**, and Violay, M. (2019), Fault Reactivation During Fluid Pressure Oscillations: Transition from Stable to Unstable Slip, *Journal of Geophysical Research: Solid Earth*, 124, 10,940–10,953, doi:10.1029/2019JB018517
6. **Giorgetti, C.**, Tesei, T., Scuderi, M. M., and Collettini, C. (2019), Experimental insights into fault reactivation in gouge-filled fault zones, *Journal of Geophysical Research: Solid Earth*, 124, 4189–4204, doi:10.1029/2018JB016813
5. Orellana, L. F., **Giorgetti, C.**, and Violay, M. (2019), Contrasting mechanical and hydraulic properties of wet and dry fault zones in a proposed shale-hosted nuclear waste repository, *Geophysical Research Letters*, 46, 1357–1366, doi:10.1029/2018GL080384
4. Kirilova, M., Toy, V., Rooney, J. S., **Giorgetti, C.**, Gordon, K. C., Collettini, C., & Takeshita, T. (2018). Structural disorder of graphite and implications for graphite thermometry. *Solid Earth*, 9(1), 223, doi:10.5194/se-9-223-2018
3. Tesei, T., Carpenter, B. M., **Giorgetti, C.**, Scuderi, M. M., Sagy, A., Scarlato, P., and Collettini, C. (2017), Friction and scale-dependent deformation processes of large experimental carbonate faults, *Journal of Structural Geology*, 100, 12–23, doi:10.1016/j.jsg.2017.05.008
2. **Giorgetti, C.**, Collettini, C., Scuderi, M. M., Barchi, M. R., and Tesei, T. (2016), Fault geometry and mechanics of marly carbonate multilayers: An integrated field and laboratory study from the northern Apennines, Italy, *Journal of Structural Geology*, 93, 1–16, doi:10.1016/j.jsg.2016.10.00

1. **Giorgetti, C.**, Carpenter, B. M., and Collettini, C. (2015), Frictional behavior of talc-calcite mixtures, *Journal of Geophysical Research: Solid Earth*, 120, 6614–6633, doi:10.1002/2015JB011970

### Selected presentations at scientific conferences

10. **Giorgetti C.**, Violay M. (2020), The influence of loading path on fault reactivation: a laboratory perspective, EGU General Assembly 2020, Online, 4–8 May 2020, EGU2020-15091, doi:10.5194/egusphere-egu2020-15091
9. **Giorgetti C.**, Louhichi I., Violay M. (2019), Load-strengthening versus load-weakening faulting in gouge-bearing faults: insights from triaxial saw-cut experiments, EGU General Assembly, Vienna, Austria, 7-12 April 2019
8. **Giorgetti C.**, T. Tesei, M.M. Scuderi, and C. Collettini (2018), Fault reactivation in thick fault zones: a laboratory perspective, AGU Fall Meeting 2018, Washington D.C., USA, 10 - 14 December 2018
7. **Giorgetti C.**, T. Tesei, M.M. Scuderi, and C. Collettini (2018), Reactivation of Gouge-bearing Faults: an Experimental Insight, 16th Swiss Geoscience Meeting 2018, Bern, Switzerland, 30 November - 1 December 2018
6. **Giorgetti C.**, Tesei T., Scuderi M.M. and Collettini C., 2018. *Fault reactivation: insights from triaxial saw-cut experiments*. TSG and MSG Joint Conference 2018, Plymouth, England, 3 – 5 January 2018
5. **Giorgetti C.**, Scuderi M.M., Tesei T., and Collettini C., 2017. *The role of pre-existing anisotropies in fault mechanics: experimental insights from triaxial saw-cut experiments*. 21st International Conference on Deformation Mechanisms, Rheology and Tectonics (DRT), Inverness, Scotland, UK, 30 April - 4 May 2017
4. **Giorgetti C.**, Collettini C., Scuderi M.M., Barchi M.R., and Tesei T., 2016. The role of anisotropy in the mechanics of faulting: an integrated field and laboratory approach. Rend. Online Soc. Geol. It., Suppl. n. 1 al Vol. 40, 88° Congresso SGI, Napoli, 7-9 September 2016
3. **Giorgetti C.**, Scuderi M.M., Barchi M.R., and Collettini C., 2016. *Fault geometry and mechanics within sealing horizons consisting of carbonate multilayers*. Tectonic Studies Group Annual Meeting 2016, London, 6 - 8 January 2016
2. **Giorgetti C.**, Carpenter B.M., and Collettini C., 2015. Fault zone microstructures from laboratory experiments on calcite/talc binary mixtures. Rend. Online Soc. Geol. It., Suppl. n. 2 al Vol. 35 (2015), Congresso congiunto SIMP-AIV-SoGeI, Firenze, 2 - 4 September 2015
1. **Giorgetti C.**, Carpenter B.M. and Collettini C., 2014. Experimental Insights into the Frictional Behavior of Calcite/Talc Binary Mixtures. Rend. Online Soc. Geol. It., Suppl. n. 1 al Vol. 31 (2014), Congresso SGI-SIMP 2014, Milano, 10 - 12 September 2014

### Organization of thematic sessions at international conferences

3. EMRP1.14 - Multiscale rock damage in geology, geophysics and geo-engineering systems. Convener: Federico Agliardi. Co-conveners: David Amitrano, Marie Violay, Christian Zangerl, Lucas Pimienta, Benedikt Ahrens, **Carolina Giorgetti**. EGU General Assembly 2020, Online, 19–30 April 2021
2. MR003 - Earthquakes in the Laboratory. Convener: Jérôme Aubry. Co-conveners: Paul Selvadurai, Timothy Officer, **Carolina Giorgetti**. AGU Fall Meeting 2020, Online, 1-17 Decembre 2020
1. EMRP1.4 - Multiscale rock damage in geology, geophysics and geo-engineering systems. Convener: Federico Agliardi. Co-conveners: David Amitrano, Marie Violay, Christian Zangerl, Lucas Pimienta, Benedikt Ahrens, **Carolina Giorgetti**, Marieke Rempe. EGU General Assembly 2020, Online, 4–8 May 2020

### Teaching and supervising activities

During my PhD, I assisted the teaching during practical modules of the courses "Structural Geology" and "Rock Physics" held by Prof. Collettini at Sapienza University of Rome, and the teaching of "Geology II" held by Prof. Carminati. During my Post-Doc, I assisted the teaching during practical modules of the courses "Rock mechanics" and "Geophysics" held by Prof. Violay, and the teaching of "Geology" held by Prof. Violay and Prof. Baumgartner at EPFL (École polytechnique fédérale de Lausanne).

I co-supervised 7 BSc theses:

- Loris Michel Ducry. "Induced seismicity in EGS reservoir in Switzerland" at EPFL, a.y. 2020/2021
- Michèle Patricia Frei. "Induced seismicity in EGS reservoir in Switzerland" at EPFL, a.y. 2020/2021
- Simon Randin. "Induced seismicity in EGS reservoir in Switzerland" at EPFL, a.y. 2020/2021
- Judith Capron. "Petrophysical parameters of Opalin Clay" at EPFL, a.y. 2019/2020
- Tom Léon Dall'Alba-Arnau. "Induced seismicity in EGS reservoir in Switzerland" at EPFL, a.y. 2018/2019
- Thibaud Maillard. "Induced seismicity in EGS reservoir in Switzerland" at EPFL, a.y. 2018/2019
- Claudia Boccardi. "Characterization of friction of mixtures of talc and calcite" at Sapienza University of Rome, a.y. 2015/2016

I co-supervised 2 MSc theses:

- Iskander Louhichi. "Role of stress field orientation on fault reactivation", at EPFL a.y. 2019/2020
- Julie Marie Guzzardi. "Role of stress field orientation on fault reactivation", at EPFL a.y. 2019/2020

## **Skills**

**Laboratory-related skills:** triaxial deformation apparatus, biaxial deformation apparatus, active acoustic measurements, strain gauge measurements, optical profilometer analysis of samples, optical microscopy analysis of thin sections of post-mortem samples, scanning electron microscopy analysis of post-mortem samples

**Programming Languages:** Matlab and Python

**Languages:** Italian (Mother Tongue), English, French (Basic), LIS (Italian Sign Language)

Lausanne, 11/06/2021  
Carolina Giorgetti